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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/756,876	01/13/2004	Christian T. Goralski JR.	81044507	3427

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EXAMINER

NGUYEN, TU MINH

ART UNIT	PAPER NUMBER
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3748

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/756,876

Applicant(s)

GORALSKI ET AL.

Examiner

Tu M. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date 20040113, 20060306.

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

DETAILED ACTION

Drawings

1. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because Figures 4-10 are of poor quality. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because on line 8 of page 1, "number _____, filed _____" should read --number 10/757,947, filed on January 13, 2004--. Appropriate correction is required.

Claim Objections

3. Claims 4, 8, and 12 are objected to because

- Claim 8, line 8 of the claim, each of the "the" should read --an--.
- Claims 4 and 12, line 2 of each claim, "H₂" should read --hydrogen-- or --H₂--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 3-5, 7, and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Miyoshi et al. (U.S. Patent 6,834,497).

Re claims 1 and 16, as shown in Figures 1-4, Miyoshi et al. disclose a method and a computer storage medium (32) having instructions encoded therein for controlling an engine having an exhaust with an emission control device (25) adapted for storing NO_x during lean operating conditions, and converting at least a portion of the NO_x during stoichiometric or rich operating conditions, the method comprising:

- operating (step S44 with Y answer and steps S52-S53) the engine to produce a lean exhaust gas mixture fed to the emission control device (up to time t₃ in Figure 3, the engine is operated with a lean air-fuel ratio); and

- after the lean operation, operating (step S45 with Y answer and steps S46-S47) the engine to produce a rich exhaust gas mixture fed to the emission control device, the rich air-fuel ratio determined as a function of at least the oxygen storage capacity of the device (see step S59 and lines 10-34 of column 18).

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Re claim 3, in the method of Miyoshi et al., as oxygen storage capacity of the device decreases, the rich air-fuel ratio becomes less rich (see lines 17-30 of column 18).

Re claim 4, in the method of Miyoshi et al., the rich air-fuel ratio is selected to provide a select amount of CO and hydrogen.

Re claim 5, in the method of Miyoshi et al., the oxygen storage capacity of the device is determined based on device degradation (see lines 30-60 of column 17).

Re claim 7, in the method of Miyoshi et al., the oxygen storage capacity of the device is determined from rich to lean transition time (see lines 55-60 of column 17).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyoshi et al. as applied to claim 1 above, in view of Poggio et al. (U.S. Patent 6,226,982).

In the method of Miyoshi et al., an oxygen storage capacity of the device (25) is based on measured data (lines 35-60 of column 17). Thus, Miyoshi et al. fail to disclose that the oxygen storage capacity of the device is estimated based on a temperature of the device. In this way, the rich air-fuel ratio is further based on temperature of the device.

As shown in Figure 1, Poggio et al. disclose an engine air-fuel ratio control based on an amount of oxygen stored in a catalytic converter device (6). As depicted in Figure 3, Poggio et al. teach that it is conventional in the art to estimate an oxygen storage capacity of the device is estimated based on a temperature of the device. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Poggio et al. in the method of Miyoshi et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art to control an engine air-fuel ratio based on a storage capacity of an emission control device.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyoshi et al. as applied to claim 5 above, in view of official notice.

The method of Miyoshi et al. discloses the invention as cited above, however, fails to disclose that the device degradation is based on at least one of an amount of sulfur contaminating the device and thermal degradation of the device.

It is well known to those with ordinary skill in the art that the emission control device (25) in Miyoshi et al. has a finite number of NO_x storage sites to store or absorb NO_x from an exhaust gas stream. The number of NO_x storage sites in the device is decreased and causes the device degradation, when the SO_x in the exhaust gas stream is absorbed in these sites or when the device is damaged due to excessive high temperature which causes the sites to fuse together. Therefore, such disclosure by Miyoshi et al. is notoriously well known in the art so as to be proper for official notice.

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9. Claims 8, 10-13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyoshi et al. in view of Sawada et al. (U.S. Patent 5,970,707).

Re claim 8, as shown in Figures 1-4, Miyoshi et al. disclose a method for controlling an engine having an exhaust with an emission control device (25) adapted for storing NO_x during lean operating conditions, and converting at least a portion the NO_x during stoichiometric or rich operating conditions, the method comprising:

- operating (step S44 with Y answer and steps S52-S53) the engine to produce a lean exhaust gas mixture fed to the emission control device (up to time t₃ in Figure 3, the engine is operated with a lean air-fuel ratio);

- estimating (steps S48-S51) an amount of NO_x release based on measured data from a NO_x sensor (26); and

- after the lean operation, operating (step S45 with Y answer and steps S46-S47) the engine to produce a rich exhaust gas mixture fed to the emission control device, the rich air-fuel ratio is determined based at least on an amount of oxygen storage capacity of the device (see step S59 and lines 10-34 of column 18).

Miyoshi et al., however, fail to disclose that instead of measured data from the NO_x sensor (26), the amount of NO_x released from the device is estimated based on an oxygen storage capacity of the device.

As shown in Figure 1, Sawada et al. disclose an engine air-fuel ratio control based on an amount of oxygen stored in a catalytic converter device (7). As indicated on lines 6-21 of column 11, Sawada et al. teach that for every mole of NO_x stored or released in the device, the device also stores or releases 0.75 mole of oxygen. It would have been obvious to one having

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ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Sawada et al. in the method of Miyoshi et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art to control an engine air-fuel ratio based on a storage capacity of an emission control device.

Re claim 10, in the modified method of Miyoshi et al., the amount of NO_x release is further based on operating conditions (rich air-fuel ratio of the engine).

Re claim 11, in the modified method of Miyoshi et al., as oxygen storage capacity of the device decreases, the rich air-fuel ratio becomes less rich (see lines 17-30 of column 18).

Re claim 12, in the modified method of Miyoshi et al., the rich air-fuel ratio is selected to provide a select amount of CO and hydrogen.

Re claim 13, in the modified method of Miyoshi et al., the oxygen storage capacity of the device is determined based on device degradation (see lines 30-60 of column 17).

Re claim 15, in the modified method of Miyoshi et al., the oxygen storage capacity of the device is determined from rich to lean transition time (see lines 55-60 of column 17).

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyoshi et al. in view of Sawada et al. as applied to claim 8 above, and further in view of Poggio et al.

In the modified method of Miyoshi et al., an oxygen storage capacity of the device (25) is based on measured data (lines 35-60 of column 17). Thus, Miyoshi et al. fail to disclose that the oxygen storage capacity of the device is estimated based on a temperature of the device. In this way, the rich air-fuel ratio is further based on temperature of the device.

As shown in Figure 1, Poggio et al. disclose an engine air-fuel ratio control based on an amount of oxygen stored in a catalytic converter device (6). As depicted in Figure 3, Poggio et

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al. teach that it is conventional in the art to estimate an oxygen storage capacity of the device is estimated based on a temperature of the device. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Poggio et al. in the method of Miyoshi et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art to control an engine air-fuel ratio based on a storage capacity of an emission control device.

11. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyoshi et al. in view of Sawada et al. as applied to claim 13 above, and further in view of official notice.

The modified method of Miyoshi et al. discloses the invention as cited above, however, fails to disclose that the device degradation is based on an amount of sulfur contaminating the device.

It is well known to those with ordinary skill in the art that the emission control device (25) in Miyoshi et al. has a finite number of NO_x storage sites to store or absorb NO_x from an exhaust gas stream. The number of NO_x storage sites in the device is decreased and causes the device degradation when the SO_x in the exhaust gas stream is absorbed in these sites. Therefore, such disclosure by Miyoshi et al. is notoriously well known in the art so as to be proper for official notice.

Prior Art

12. The IDS (PTO-1449) filed on January 13, 2004 and March 6, 2006 have been considered. An initialized copy of each is attached hereto.

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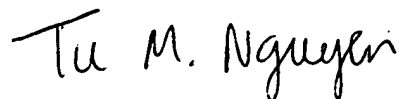
13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of four patents: Akazaki et al. (U.S. Patent 5,937,638), Kako et al. (U.S. Patent 6,481,201), Nakamura (U.S. Patent 6,622,478), and Kamoto et al. (U.S. Patent 7,117,665) further disclose a state of the art.

Communication

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



TMN

February 4, 2007

Tu M. Nguyen

Primary Examiner

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